

Remarks/Arguments

A. Status of the Claims

Claims 22-24 and 28-43 were pending when the June 1, 2006 Office Action was mailed to Applicant. Claims 36, 40, and 41 have been amended.

Claims 22-24 and 28-43 are pending.

B. The Indefiniteness Rejection Is Moot

Claims 36, 37, 40, and 41 are rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. The Examiner contends that the claims are alleged to be indefinite because they depend from canceled claims. Claims 36, 40, and 41 have been revised to dependent from independent claim 22. The indefiniteness rejection is therefore moot, and Applicant requests that it be withdrawn.

C. The Anticipation Rejections Are Overcome

1. Summary of Rejection and Applicant's Arguments

The Examiner maintains the two previous anticipation rejections for claims 22-24, 29, 30, 33-35, 38, and 40-43 in view of WO 01/36508 and WO 01/36507 (the '508 and '507 Publications, respectively). In summary, the Examiner contends that these references disclose Applicant's claimed prepolymers. Action at pages 2-3. The Examiner reasons:

Despite applicants' remarks, the references disclose polysulfide reactants that do not contain applicants' excluded disulfide (-S-S-) linkage that are used to produce isocyanate functional prepolymers. Examples of such reactants are located within page 6 of the references. Despite applicants' remarks, applicants have provided no definition of what constitutes a prepolymer, as it pertains to the active hydrogen containing compounds; therefore, the position is taken that virtually any polysulfide containing active hydrogen containing compound meets applicants' claimed diol or thiol prepolymer.

Id. at page 3.

Applicant disagrees. The cited references fail to disclose every element of Applicant's claimed invention. *See* MPEP § 2131 ("To anticipate a claim, the reference must teach every element of the claim"). For instance, and as explained in detail below, the references fail to disclose "at least one (α , ω)-diiso(thio)cyanate **polysulfide prepolymer...being free from disulfide (-S-S-) linkage...**wherein the (α , ω)-diiso(thio)cyanate polysulfide prepolymer is the reaction product of at least one cycloaliphatic or aromatic diiso(thio)cyanate and at least one (α , ω)-diol or dithiol **prepolymer**, said (α , ω)-diol or dithiol **prepolymer being a polysulfide or a mixture of polysulfides.**" Claim 22 (emphasis added).

2. Prepolymers Are Not Monomers

It appears that the Examiner's position is, at least in part, based on an argument that prepolymers include monomers. Action at pages 2-3. This position is incorrect, because a person of ordinary skill in the art would understand that prepolymers are not monomers.

In fact, the International Union of Pure and Applied Chemistry (IUPAC), which is the recognized authority in developing standards for naming and describing chemical compounds,

confirms that pre-polymers are not monomers. For instance, IUPAC describe a pre-polymer molecule as a macromolecule or oligomer:

pre-polymer molecule

A *macromolecule* or *oligomer molecule* capable of entering, through reactive groups, into further *polymerization*, thereby contributing more than one *monomeric unit* to at least one chain of the final macromolecule.

Appendix A, IUPAC Compendium of Chemical Terminology, 2nd Edition (1997) (emphasis in original). This definition clearly distinguishes between pre-polymers and monomers. *Id.* (“...thereby contributing more than one monomeric unit...”). IUPAC also explains that pre-polymers are:

pre-polymer

A polymer or oligomer composed of *pre-polymer molecules*.

Appendix B, IUPAC Compendium of Chemical Terminology, 2nd Edition (1997) (emphasis in original).

Further, IUPAC confirms that a monomer molecule is a single monomeric unit, which by definition, is not a pre-polymer:

monomer molecule

A molecule which can undergo *polymerization* thereby contributing *constitutional units* to the essential structure of a macromolecule.

monomeric unit (monomer unit, mer)

The largest *constitutional unit* contributed by a single monomer molecule to the structure of a *macromolecule* or *oligomer molecule*.

monomer

A substance composed of *monomer molecules*.

Appendices C through E, respectively, IUPAC Compendium of Chemical Terminology, 2nd Edition (1997) (emphasis in original) (underline added).

The above definitions by IUPAC confirm that pre-polymers are not monomers. As discussed in detail in the following section, this evidence also confirms that the ‘508 and ‘507 Publications fail to anticipate Applicant’s claimed invention.

3. The ‘508 and ‘507 Publications Fail to Disclose Every Element of Applicant’s Invention

The ‘508 and ‘507 Publications appear to concern polythiol monomers having a sulfide group. ‘507 and ‘508 Applications, page 6, line 6, and page 6, line 2, respectively. There does not appear to be any disclosure of “at least one (α , ω)-diiso(thio)cyanate polysulfide prepolymer ... being free from disulfide (-S-S-) linkage...said prepolymer is the reaction product of at least one ... (α , ω)-diol or dithiol prepolymer, said (α , ω)-diol or dithiol prepolymer being a polysulfide or a mixture of polysulfides.” Claim 22 (emphasis added). The arguments made in Applicant’s March 17, 2006 Submission against the anticipation rejection are incorporated into this section by reference. These arguments confirm that the cited references fail to disclose every element of Applicant’s claimed invention and are, therefore, not anticipatory references.

Additionally, Applicant would like to address the Examiner’s statement at page 3 of the present Action that “...the references disclose polysulfide reactants that do not contain applicants’ excluded disulfide (-S-S-) linkage that are used to produce isocyanate functional prepolymers.” The Examiner refers to the compounds disclosed at page 6 of the ‘508 and ‘507 Publications for support.

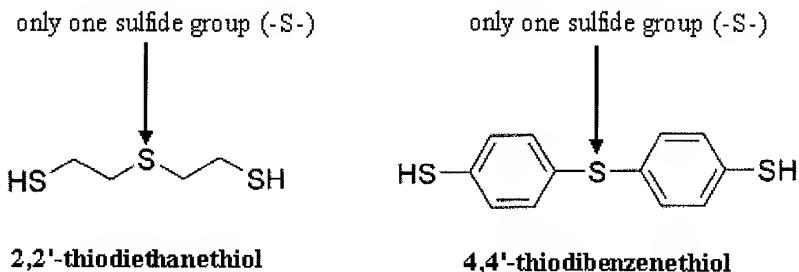
The compounds at page 6 of the references confirm that the Examiner's position is incorrect. Applicant has reviewed the '508 and '507 Publications to identify the polythiol compounds that contain sulfide groups. A list of these compounds is below:

- (i) 2,2'-thiodiethanethiol at page 6 of both Publications;
- (ii) 4,4'-thiodibzenenethiol at page 6 of both Publications;
- (iii) 4-mercaptopethyl-3,6-dithia-1,8-octanedithiol at page 6 of both Publications;
- (iv) dithianes such as the compounds identified at page 9 of both Publications; and
- (v) polythiols described from pages 7-9 of both Publications.

These compounds are either monomers which are not Applicant's prepolymers (see above regarding monomers are not prepolymers) and/or include Applicant's excluded "disulfide (-S-S-) linkage..." and/or are not polysulfides.

(a) 2,2'-thiodiethanethiol and 4,4'-thiodibzenenethiol are not polysulfides

2,2'-thiodiethanethiol and 4,4'-thiodibzenenethiol only include one sulfide group (-S-) and are therefore not polysulfides as illustrated by the following structures:



Additionally, and as previously explained, the -SH groups in these molecules are not sulfide groups. See, e.g., Applicant's March 17, 2006 Submission at page 12. Rather, they are thiol groups. Thiols and sulfides are defined by IUPAC as:

thiols

Compounds having the structure RSH (R ≠ H), e.g. MeCH₂SH ethanethiol.

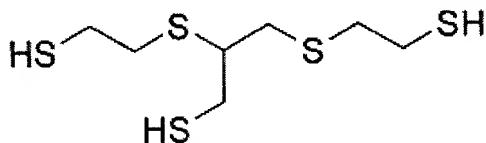
sulfides

1. Compounds having the structure RSR (R ≠ H). Such compounds were once called thioethers. See also *thioacetals*.

Appendices F-G, IUPAC Compendium of Chemical Terminology, 2nd Edition (1997).

(b) ***4-mercaptomethyl-3,6-dithia-1,8-octanedithiol is a monomer***

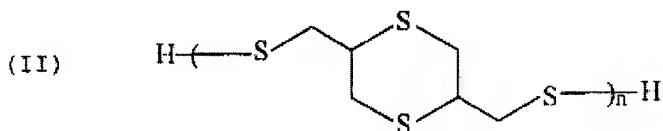
4-mercaptomethyl-3,6-dithia-1,8-octanedithiol is a monomer according to the IUPAC definition. The chemical structure of this compound is the following:



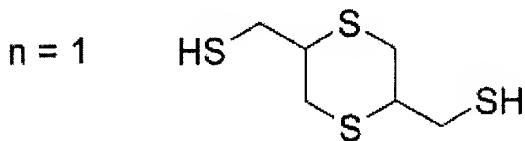
4-mercaptomethyl-3,6-dithia-1,8-octanedithiol

(c) ***Dithianes of the '508 and '507 Publications are either monomers or include at least one disulfide linkage (-S-S-)***

The dithianes disclosed in the '508 and '507 Publications are either monomers or include at least one disulfide linkage (-S-S-). For instance, generic formula II (page 9 of both references) represents dithiane monomers when n=1:

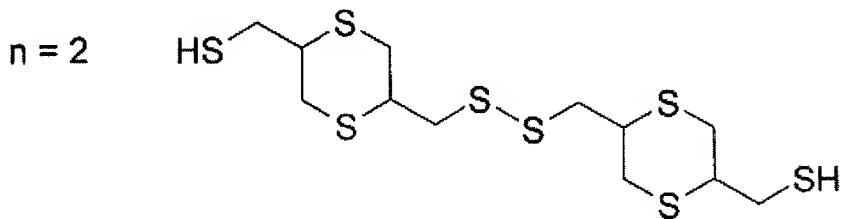


generic formula (II)



generic formula (II) when n=1

When n is greater than 1, then disulfide linkages are present in the structure:



generic formula (II) when n=2

In fact, the presence of disulfide linkages is confirmed by the '508 and '507 Publications which explain:

In an embodiment of the present invention, the polythiol oligomer having disulfide linkages may be selected from those represented by the following general formula II,

'508 Publication at page 9, lines 18-20 (underline added); *see also* '507 Publication at page 9, lines 22-24.

(d) Polythiols of the '508 and '507 Publications include at least one disulfide linkage (-S-S-)

Polythiols described on pages 7-9 of the '508 and '507 Publications include at least one disulfide linkage (-S-S-). For instance, the '508 Publication explains:

The polythiol monomer used to prepare the polycyanate reactant may be a polythiol oligomer having disulfide linkages, which is prepared from the reaction of a polythiol monomer having at least two thiol groups and sulfur in the presence of a basic catalyst.

'508 Publication at page 7, lines 31-35; *see also* '507 Publication at page 7, line 35, to page 8, line 2 (underline added). Additionally, and as explained in detail above, when n is greater than 1 in generic formula (II), the corresponding compound includes at least one disulfide (-S-S-) linkage.

(e) Conclusion on the '508 and '507 Publications

The '508 and '507 Publications include polythiol reactants that are: (1) monomers and not Applicant's claimed prepolymers; and/or (2) include disulfide (-S-S-) linkages which is disclaimed by Applicant (*i.e.*, "said prepolymer being free from disulfide (-S-S-) linkage"); and/or (3) not polysulfides. Therefore, the cited Publications fail to disclose every element of Applicant's claimed invention.

Applicant requests that the anticipation rejections over the '508 and '507 Publication be withdrawn.

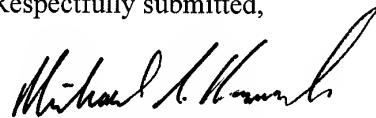
D. Conclusion

Applicant believes that the present document is a full and complete response to the Office Action dated June 1, 2006. The present case is in condition for allowance and such favorable action is requested.

It is believed that no fee is due for filing this Response. Should any fees under 37 C.F.R. §§ 1.16 to 1.21 be required for any reason relating to this document, the Commissioner is authorized to deduct said fees from or to Fulbright & Jaworski Deposit Account No. 50-1212/ESSR:058US.

The Examiner is invited to contact the undersigned Attorney at (512) 536-3020 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,



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Date: September 1, 2006

APPENDIX A

pre-polymer molecule

A *macromolecule* or *oligomer molecule* capable of entering, through reactive groups, into further *polymerization*, thereby contributing more than one *monomeric unit* to at least one chain of the final macromolecule.

A pre-polymer molecule capable of entering into further polymerization through reactive *end-groups*, often deliberately introduced, is known as a telechelic molecule.

1996, 68, 2290

APPENDIX B

pre-polymer

A polymer or oligomer composed of *pre-polymer molecules*.

1996, 68, 2304

APPENDIX C

monomer molecule

A molecule which can undergo *polymerization* thereby contributing *constitutional units* to the essential structure of a macromolecule.

1996, 68, 2289

APPENDIX D

monomeric unit (monomer unit, mer)

The largest *constitutional unit* contributed by a single monomer molecule to the structure of a *macromolecule* or *oligomer molecule*.

Note:

The largest constitutional unit contributed by a single monomer molecule to the structure of a macromolecule or oligomer molecule may be described as either *monomeric*, or by *monomer* used adjectivally.

1996, 68, 2290

APPENDIX E

monomer

A substance composed of *monomer molecules*.

1996, 68, 2290

APPENDIX F

thiols

Compounds having the structure RSH ($R \neq H$), e.g. MeCH₂SH ethanethiol.
Also known by the term mercaptans (abandoned by IUPAC).

1995, 67, 1372

APPENDIX G

sulfides

1. Compounds having the structure RSR ($R \neq H$). Such compounds were once called thioethers. See also *thioacetals*.
2. In an inorganic sense, salts or other derivatives of hydrogen sulfide.
3. A term used in additive nomenclature, see *imides* (2).

1995, 67, 1368